In the Claims

Claim 1. (Previously presented) A method of real-time controlling exposure time in an x-ray apparatus, the apparatus comprising an x-ray source and a displaceable detector arranged to move with a controllable speed across an image exposure area, said detector having a first and a second edge, said first edge being adjacent to a movement direction of said detector, the method comprising the steps of:

a. setting a target signal, calculated to obtain a pre-defined signal to noise ratio (SNR),

b. setting a detector Region Of Interest (ROI), comprising a sensor in said first edge,

c. start scanning,

d. collecting a signal from said ROI (404),

e. compensating the signal with respect to at least one of ROI size and efficiency,

f. comparing the signal with a target signal (S_{target}) and calculating a new optimal velocity (406), and

g. setting a new velocity during said scanning.

Claim 2. (Previously presented) The method of claim 1, wherein the target value is calculated from a thickness of the object to be inspected and spectrum incident on the object.

Claim 3. (Original) The method of claim 1, wherein the signal is acquired from a discrete number of regions on said detector.

Claim 4. (Original) The method of claim 1, wherein the detector is a photon-counting detector and the signal is the counted number of photons.

Claim 5. (Previously presented) The method of claim 1, wherein a distance the detector moves between readouts defines pixels in the scan direction as a first dimension, and in a second dimension, the detector comprises actual pixels.

Claim 6. (Previously presented) The method of claim 1, wherein the detector functions as a part of an exposure control system and an image receptor.

Claim 7. (Previously presented) The method of claim 1, wherein based on a number of photons collected in a predefined region of the detector, the scan velocity is alternated.

Claim 8. (Previously presented) The method of claim 7, further comprising changing scan-speed with respect to a count rate change in said region for controlling the number of counts reached per a first dimension pixel.

Claim 9. (Previously presented) The method of claim 7, comprising a feedback from said displaceable detector based on the count rate in said region.

Claim 10. (Previously presented) The method of claim 9, wherein said feedback is real-time and controls the scan speed of the detector.

Claim 11. (Previously presented) The method of claim 10, wherein the exposure of each point along an x-axis is controlled based on the count rate of said region and thus the entire image has a controllable signal level along the first dimension at least in said region in the second dimension.

Claim 12. (Previously presented) The method of claim 9, further comprising the step of minimizing total scan time by areas not covered by dense objects being scanned with increased speed and thus exposed shorter.

Claim 13. (Original) The method of claim 1, wherein said detector itself is used to control the exposure.

Claim 14. (Currently amended) The method of claim [[15]] 1, wherein said step d comprises reading a number of counted photons or SNR.

Claim 15. (Currently amended) The method of claim [[15]] 1, wherein said x-ray apparatus is a photon counting device and a new velocity (V_{new}) is calculated as $V_{new} = V_{old} \times S_{target} / S_{measured}$, wherein V_{old} is the old velocity, S_{target} is target signal and $S_{measured}$ is a measured signal.

Claim 16. (Previously presented) The method of claim 1, wherein in said step f, if target signal is higher than measured signal then the velocity is decreased otherwise old velocity is maintained.

Claim 17. (Previously presented) The method of claim 1, wherein said step f includes requiring new velocity to be at least higher than a pre-set minimum velocity.

Claim 18. (Previously presented) The method of claim 1, wherein depending on detector size the velocity decreases, if the target signal is higher than the measured signal otherwise the velocity is increased.

Claim 19. (Previously presented) The method of claim 1, comprising the alternative step f, said alternative step comprising:

a. collecting a compression height ($h_{compression}$) data, projection and data about an examination type,

b. collecting from previous examinations, based on previous step, typical examination object density profile,

c. calculating an optimal velocity profile based on estimation of said density profile and measured signals, and

d. calculating new velocity based on data from steps a.- c.

Claim 20. (Currently Amended) The method of claim 1, wherein said step of choosing the ROI includes:

~~(a)~~ a. deciding an scan direction,

~~(b)~~ b. choosing an ROI that will enter the object first, and

~~(c)~~ c. checking that said ROI has a sufficient number of operative detector elements working else choosing next appropriate ROI.

Claim 21. (Previously presented) An arrangement for controlling exposure time mountable in an x-ray apparatus comprising an x-ray source and a displaceable detector arranged to be displaced with a controllable speed across an image exposure area, and said detector having a first edge arranged as leading edge in a displacement direction, said detector further comprising a Region Of Interest (ROI) comprising a sensor in said first edge, the arrangement comprising arrangement for setting a target signal, calculated to obtain a pre-defined signal to noise ratio (SNR), arrangement for obtaining a start velocity, arrangement for collecting a signal from said ROI, arrangement for compensating the signal with respect to at least one of ROI size and efficiency, comparing arrangement for comparing the signal with a target signal (S_{target}), arrangement for calculating a new optimal velocity, and an arrangement for setting a new velocity during said scanning.

Claim 22. (Previously presented) The arrangement of claim 21, wherein said arrangement for receiving detected signals is a processing unit and said arrangement (804) for controlling the detector replacement is a motor controller.

Claim 23. (Original) The arrangement of claim 21, wherein said displacement controller controls rotation of said detector having a rotation centre in said x-ray source.

Claim 24. (Currently Amended) An X-ray apparatus of a photon counting type, said apparatus comprising an x-ray source and a displaceable detector being configured to move with a controllable speed across an image exposure area, in a direction, said apparatus further comprising:

[[•]] a. an arrangement configured to count a number of photons detected by said displaceable detector, which comprises an end portion arranged as a leading edge in said direction,

[[•]] b. a comparator arrangement configured to compare the counted number of photons from a sensor in said end portion under a scanning movement with a pre-set value, and

[[•]] c. a controller arrangement configured to: ~~control said speed of the detector displacement with respect to a result obtained from a signal from said sensor, said signal corresponding to a density of an object to be examined under said scanning movement.~~

i. set a target signal, calculated to obtain a pre-defined signal to noise ratio (SNR),

ii. set a detector Region Of Interest (ROI), comprising a sensor in said leading edge,

iii. collect a signal from said ROI, and compensate said signal with respect to at least one of ROI size and efficiency,

iv compare said signal with a target signal (S_{target}) and calculating a new optimal velocity; and,

v. set a new velocity during said scanning.

Claims 25 – 27. (Cancelled).